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GEOGRAPHICAL RECORD

AMERICAN GEOGRAPHICAL SOCIETY

Opening of the Lecture Season. The lecture program of the Society will open at eight-thirty o'clock on November 20 with an address by Mr. Donald B. MacMillan on the geographical work of the Crocker Land Expedition, of which he was leader. It will be recalled by readers of the *Geographical Review* that this expedition left for its base camp at Etah, Greenland, in 1913; that its main object was to explore Crocker Land; and that three relief expeditions in successive years were required to get the members safely home. The last relief ship, the *Neptune*, was commanded by Captain Robert A. Bartlett, to whose able seamanship is due the safe passage of the expedition through the extraordinary ice fields that marked the summer of 1917. The story of the expedition is of exceptional interest, for, though "Crocker Land" was found to be only a mirage, many valuable scientific results were secured by heroic perseverance in the face of great hardship.

Death of Mr. Henry Parish. Mr. Henry Parish died on September 18. Up to the time of his death he maintained an active interest in the Society, which dated from his election to Fellowship in 1872. He was a member of the Council for many years and was Chairman of it from 1895 to 1906, retiring only by reason of advanced years. He was consistent and broad in his care for the interests of the Society, supporting it with his means and by active personal effort. He was especially interested in the various Arctic expeditions to which the Society lent its sanction. During the period of his connection with the organization he saw it develop from a modest institution at 29th Street to its present extensive field of usefulness in its beautiful building at 156th Street, to the erection of which he contributed. His activities on behalf of the Society form only one of many works of public usefulness on his part which have stamped his memory as a worthy public-spirited citizen of New York.

Death of Councilor Charles Harrison Tweed. The Society is called upon to record with deep sorrow the death of its Councilor, Mr. Charles Harrison Tweed, who died on October 11. He had been for many years a Fellow of the Society and found time in the midst of an unusually active career to give counsel and help to the affairs of the American Geographical Society. His judgment was always accurate and his advice most valuable. His support of the active administration was constant and loyal. His associates and fellow Councilors share with a large circle of friends the sorrow occasioned by his decease.

NORTH AMERICA

Sign Posts in the Western Deserts. The gold rush of '49 involved the use of almost every available western trail. Men went by thousands into an untried wilderness, and through a heavy toll of life the worst desert places acquired a sinister fame. With better knowledge of the ground water and the location of springs, and with the building of railways, the dangers were diminished. This does not mean that the arid region of the West has been conquered. Much of it is still forbidding and some of it dangerous to cross. The desert still surprises the over-confident traveler.

The plan of erecting sign posts which will further diminish the dangers of desert travel is now actually under way. In 1916 Congress authorized the Department of the Interior to "develop, protect, and render more accessible for the benefit of the general public, springs, streams, and water holes on arid public lands of the United States; and in connection herewith to erect and maintain suitable and durable monuments and sign-boards at proper places and intervals along and near the accustomed lines of travel and over the general area of said desert lands, containing information and directions as to the location and nature of said springs, streams, and water holes, to the end that the same may be more readily traced and found by persons in search or need thereof; also to provide convenient and ready means, apparatus, and appliances by which water may

be brought to the earth's surface at said water holes for the use of such persons; also to prepare and distribute suitable maps, reports, and general information relating to said springs, streams, and water holes, and their specific location with reference to lines of travel." But, unfortunately, funds were not provided until 1917, when \$10,000 was appropriated. The U. S. Geological Survey is in charge of the work, which is still in the preliminary stage.

From Mr. George W. Parsons, a Fellow of the Society, there has been received an interesting collection of photographs, clippings, and memoranda showing the progress that has been made in the desert sign-post movement, of which he is the author.

The Aboriginal Culture Areas of North America. Recent discussions and reports on the physiographic divisions of North America and especially of the United States have aroused a fresh interest in the bases of such classifications. Two papers appearing originally in the *American Anthropologist* and the *Journal of American Folk-Lore* and reprinted in a volume of similar studies (*Anthropology in North America*, G. E. Stechert & Co., New York, 1915) present subdivisions of the North American continent based on the culture and traits of its ancient inhabitants. These classifications reverse the process used by the geographer and take the resultants as the unit rather than the underlying causes. The first paper (Areas of American Culture Characterization Tentatively Outlined as an Aid in the Study of the Antiquities, by W. H. Holmes, pp. 42-75) divides North America into sixteen cultural areas, eleven excluding Mexico and Central America, viz.: (1) the North Atlantic area; (2) the Georgia-Florida area; (3) the Middle and Lower Mississippi Valley region; (4) the Upper Mississippi and Lakes region; (5) the Plains and Rocky Mountains; (6) the arid region [of the Southwest]; (7) the California area; (8) the Columbia-Fraser area; (9) the Northwest Coast area; (10) the Arctic coastal area; (11) the Great Northern-Central area. The classification by many museum directors of archeological material according to present political divisions has its analogy in geography in the use of the state or group of states as the unit of study. This policy has the same disadvantages in archeology as was found in geography, and the movement towards cultural regions in anthropology has the same necessity which hastened the wide adoption of regional geography. Holmes' divisions, tentatively suggested, are based on the clearly manifested phases of their culture content. It is recognized that the boundaries are at times not well defined, that cultures overlap and blend along easy lines of communication, and that the extension of knowledge may and probably will cause the shifting of the boundaries. The cultural divisions as illustrated on the map appended to the paper have certain agreements with some of the studies of physiographic provinces in North America (see W. L. G. Joerg: The Subdivision of North America into Natural Regions, *Annals Assoc. Amer. Geogrs.*, Vol. 4, 1914, pp. 55-83), and the conclusion is forced upon the archeologist that the relations of environment to man and culture must play an important part in the prosecution of his researches.

The second paper (Material Cultures of the North American Indians by Clark Wissler, pp. 76-134) follows somewhat the same lines of procedure as the preceding paper. Wissler's map shows but nine cultural areas north of Mexico, as follows: (1) the Eastern woodland area; (2) the Southeastern area; (3) the Plains area; (4) the Southwestern area; (5) the California area; (6) the Plateau area, (7) the North Pacific area; (8) the Mackenzie area; (9) the Arctic area. It thus essentially differs from Holmes' classification only in making two subdivisions east of the Great Plains where Holmes uses four. In describing the culture areas, Wissler states that each tends to have well within its borders a group of tribes whose cultures are quite free from the characteristic traits of other areas. As the spread of characteristic cultures is in this case also the basis of the cultural provinces, it is expectable that these should in the main be the larger geographical provinces. This paper enters into a greater detail of description than the preceding one and with many examples illustrates the theory of trait associations and the diffusion of material traits. In his conclusion, Wissler suggests that the significance of the geographical environment as a localizer, associator, or carrier of material traits or as a factor making for the continuity of a trait is a problem well worth considerable study.

ROBERT M. BROWN.

The Potash Industry of the United States. In 1915 were made the beginnings of a domestic potash industry. In the first half of 1917, according to figures of the U. S. Geological Survey (*Press Bull. No. 335*, September, 1917), production had risen to 14,000 tons, valued at a sum approaching \$6,000,000. The principal sources of this output were natural salts and brines and kelp, respectively accounting for about one-half and one-quarter of the total; alunite, dust from cement mills and blast furnaces, miscellaneous industrial wastes, and wood ashes contributed the remainder. The greatest single source, supplying one-third, was constituted by the Nebraska alkali lakes, described

in the *Review* for January (Vol. 3, 1917, pp. 67-68). Such a production is not inconsiderable for a new industry, but it still represents only about 10 per cent of the normal annual consumption prior to the war. For a further increase we are now encouraged to look to the much-talked-of deposit of Searles Lake (for a description of the "lake", by Hoyt S. Gale, see *U. S. Geol. Survey Bull.* 580-L, 1914). Development here has been held back pending legislation on the status of potash-bearing lands. On passage of the bill now before the Senate the product of the new Californian source may make its appearance in the market.

Extension of the Eastern Forest Reserves. In line with the policy to extend the National Forests, especially about the headwaters of navigable streams, the Government announces (*Official Bulletin*, June 26, 1917, p. 6) that 51,916 acres have been approved for purchase in the White Mountains and the Southern Appalachians. These tracts are an extension of the acquisitions already noted (*Bull. Amer. Geogr. Soc.*, Vol. 47, 1915, pp. 875-876, and *Geogr. Rev.*, Vol. 2, 1916, pp. 223-224). The purchase was made possible by the appropriation of \$3,000,000 voted by Congress on August 9, 1916, for the extension, during 1917 and 1918, of the forest reserves already formed under the Weeks Law. The total now acquired under the provisions of that law, including this last addition, amounts to 1,456,200 acres.

The Destructive Eruption of San Salvador Volcano on June 7, 1917. On June 7, for the third time within three-quarters of a century, the city of San Salvador was almost completely destroyed by earthquake shock. At the same time an outpouring of lava from the San Salvador volcano a few miles to the northwest laid waste much valuable coffee and maize land. Moreover, hot ashes carried by the wind over the mountain withered the beautiful plantations of the Santa Tecla Valley: "at least 35,000 quintals of coffee are lost, and probably 70,000 of sugar," writes a resident to the *Geographical Journal* (September, 1917). The volcanic and seismic phenomena are briefly described by Herbert J. Spinden of the American Museum of Natural History, who was present in San Salvador at the time (*Scientific American*, August 4, 1917). The first violent movement of the ground effected little damage in the capital city but caused heavy destruction in Quezaltepeque and other villages of the northern slope. Apparently this shock coincided with the opening of new vents on this side of the mountain. An hour or two later came the shock that ruined the capital. It is not improbable that the later movement represents a collapse of the crust following upon the withdrawal of lava from the interior. Prior to the eruption, slight tremors had been numerous for some days, and for several succeeding days shocks continued practically without cessation.

Earlier eruptions and other manifestations in this zone of active vulcanism are noted in a contemporary number of *La Nature* (No. 2287, July 28, 1917).

SOUTH AMERICA

The Geographical Results of Dr. Farabee's Explorations in the Amazon Basin.

Published accounts are now available of Dr. Farabee's explorations in the Amazon Basin in 1913-1916 (W. C. Farabee: *A Pioneer in Amazonia: The Narrative of a Journey from Manáos to Georgetown*, *Bull. Geogr. Soc. of Philadelphia*, Vol. 15, 1917, pp. 57-103, with map, 1:1,200,000; *idem*, *The Amazon Expedition of the University Museum*, *Univ. of Pennsylvania Museum Journ.*, Vol. 7, 1916, pp. 210-244, Vol. 8, 1917, pp. 60-82 and 126-244). These make possible the presentation of the geographical results of the expedition in greater detail than in the note in the February *Review* (Vol. 3, 1917, p. 149).

In the course of the journey to the first of the four areas visited on the expedition, the Guiana highlands, the Rio Negro and its tributary, the Rio Branco, were followed, the grasslands and the southern forests of Guiana penetrated, and the Corentyn descended to its mouth. In the Guiana forests the expedition passed through territory beyond the limits of Schomburgk's explorations and among tribes to whom the white man was absolutely unknown. The Akarai Mountains, forming the divide between the Amazon and the Guiana streams and the accepted but undelimited boundary between southern British Guiana and Brazil, were crossed and recrossed and important observations made on the hydrography of the region. On the economic prospects of British Guiana Dr. Farabee says much of interest. The savannas of the interior plateaus are well suited for cattle raising. At present economic production is practically nil. Such cattle as are exported must find their way with the Brazilian beasts of the Rio Branco to Manáos:

there exists no road to the home market that otherwise could be found on the coast. Dr. Farabee endorses the opinion of every traveler in this part of the country—the need for a railroad to connect the interior with Georgetown. (Compare C. Clementi: A Journey to Mount Roraima across the Savannah Highlands of British Guiana, *Timehri*, Ser. 3, 1917, Vol. 4, and also the article on the same journey in the *Geogr. Journ.*, Vol. 48, 1916, and see the proposed interior railway shown on the official map of the colony, 1913). At Dada-nawa, the station occupied by the Government's Protector of the Indians, agriculture with irrigation was proving successful. The rainfall, approximating 60 inches per annum, falls almost entirely in June, but underground water is abundant, a steady east wind prevails, and "the windmill is all that is needed to make this a valuable agricultural region"—when communications are established. In the opinion of Dr. Farabee the upper basin of the Corentyn, now clothed with hardwood forest and apparently destitute of inhabitants, also offers a suitable field for colonization. Some day it will become valuable, and before this happens the sources of the Corentyn should be determined and the boundary with Dutch Guiana be delimited.

On his second journey Dr. Farabee proceeded up the Amazon to Iquitos and thence up the Ucayali to Cumaria, the head of launch navigation. Here no part of the terrain covered was new ground, but it provided a splendid field for the acquisition of ethnographical material, an important task in a region where the primitive life of the native is fast disappearing before the advance of civilization. Today on the larger streams of the rubber country the primitive is mingling with the modern in strange ways. On the Ucayali was seen "a dugout canoe fitted with an Evinrude gasoline motor and used by a Conebo Indian to bring rubber from the small rivers to the station."

The advent of the rainy season in southwestern Amazonia made practicable a journey up the Rio Purus to Senna Madureira, the capital of the Territory of Acre. Here rubber has been responsible for a rapid development. Since the Acre passed into Brazilian possession the capital of the district has appeared as a modern settlement, with trams and electric light, with streets and schools, and with houses well built of North American lumber. Of the various modern improvements the recent installation of wireless telegraphy is one of the greatest boons to the rubber collector, for by it he is kept in touch with market prices of rubber and is no longer at the mercy of the trader from Pará. Along the Purus the expedition's ethnological investigations were pursued with some difficulty. Even during the dry season comparatively few "wild" Indians are seen on the main stream, from which they have been driven by the rubber gatherer and his local destruction of game; during the wet season Indian encampments are only to be found some days' journey in the interior. To secure the data collected on four little-known Arawak-speaking tribes several side trips had to be made into the flooded forest.

The last journey of the expedition was made up the Tapajoz to visit the Mundurucus, the "head hunters," so named from their practice of preserving the heads of their enemies, a custom also in vogue among the Jivaros and other Amazonian tribes. The area occupied by the Mundurucus, who were formerly found on the banks of the main river, is now diminished: they have retreated to the semi-desert interior west of the divide between the Tapajoz and the Xingú. Another interesting tribe surviving in the Tapajoz basin is the Apiacas. To many native tribes along the navigable waterways Amazonian transportation owes a great and unrecognized debt. The Apiacas have such a claim on Matto Grosso. During the Paraguayan war, when the southern route via the Paraguay river was closed to western Brazil, a northern road was opened via the Tapajoz, and on it the Apiacas were employed as cargo-men. Today a good deal of fine rubber is carried down the Tapajoz and here, as on other Amazonian streams, the expert native paddle is effectively supplemented with motive power. "The journey to Matto Grosso, which requires from four to six weeks in a loaded canoe with paddles, can be made in twelve days by the aid of a motor."

EUROPE

A Forecast of Coming Winters in Western Europe. Mr. C. Easton in a letter to *Nature* (August 30, 1917, pp. 524-525) calls attention to some of the results of his extensive statistical study of winter temperatures in western Europe. After showing the close correspondence of the Paris and Utrecht temperature observations with the historical data for the past 89 years, he carries his investigation of winter temperatures back to the year A. D. 759. In these 1,157 winters there is a periodicity of 45 and 89 years, which in some respects is quite striking. Dividing the 1,157 winters into thirteen

89-year periods and then totaling the cold and severe winters for each quarter of the periods, the following results were obtained: first quarter, 30 cold and 12 severe winters; second quarter, 22 cold and 7 severe winters; third quarter, 31 cold and 15 severe winters; fourth quarter, 11 cold and 2 severe winters. In other words, the chances are that only one of the last 22 winters in one of these 89-year periods will be very cold or severe; while three or four such winters may be expected in each of the first and third 22-year periods, and two in the second. "The chance that the last quarter of an 89-year period contains a smaller number of hard winters than the preceding and following 22-year intervals is 0.88." The author says: "So early as 1905 I pointed out that a series of warm winters might be expected in the following years, according to these statistics, and that the year 1917 marked the beginning of a new period of comparatively cold winters. Though it seems a matter of mere chance that exactly the winter of 1916-1917 turned out to be the first . . . really cold winter since 1895 in western Europe; nevertheless a change in the weather type about this time is in perfect agreement with the forecast." The author considers these periods "undoubtedly related to similar fluctuations in the sun's activity" and says that increased activity of the solar surface corresponds in general to earlier and colder winters in western Europe. "The forecast for the period 1917-1938, derived from these statistics, indicates at least two very cold and one severe winter; the average winter temperature for these twenty-two years being generally below the 89-year mean."

CHARLES F. BROOKS.

The Utilization of Imatra Fall, Finland, for Hydro-Electric Power. One of the few channels by which the Finnish Lake Plateau discharges its waters into the low-land below is the Vuoksen River. This river drains Lake Saima, one of the larger bodies of water at the southeastern margin of this lake-studded platform, into Lake Ladoga and thus descends from a level of 255 feet to one of only 16 feet above the sea. Where the river discharges over the moraine-covered lip of the granitic platform it forms the well-known rapids known as the Imatra Fall. The rapids themselves have a fall of about 65 feet in a distance of 1,060 feet, the river here narrowing abruptly from a width of 580 feet to 154 feet. Thus all elements for the development of a high degree of water power are here concentrated. Investigations made before the war as to the amount of electrical energy to be derived from this source had shown that sufficient power could be generated to meet all future requirements for lighting, street railways, and the electrification of railroads in southeastern Finland and the Petrograd district (Petrograd being only 93 miles in an air line from Imatra Fall). In addition the water power is available of various other rapids and falls along the course of the Vuoksen River. What the fate of various projects under way in 1914 will be after the war is over is hard to conjecture, but, as *Russia* (R. Martens & Co., New York) for August observes, there is every likelihood of an opening for foreign capital to assist in developing this highly important resource.

An Aërial Mail Service between Continental and Insular Italy. The establishment of aërial mail service between islands and their mainlands promises a peculiarly valuable aid to the facilitation of their problems of communication. In this country a service between Nantucket Island and New Bedford has been proposed (*Geogr. Rev.*, Vol. 2, 1916, p. 152) and is expected to be in operation shortly, but in this field we are forestalled by Italy. Already regular mail service exists between the mainland and the islands of Sicily and Sardinia (*Journ. Roy. Soc. of Arts*, August 3, 1917, p. 644). The one route connects Naples and Palermo and is covered in two and one-half hours. The other route connects Civitavecchia and Terranova-Pausania and the journey occupies an hour and forty minutes.

The inauguration of another aërial mail line in Italy is reported in the September number of *Flying* (Mario de Bernardi: *The First Permanent Aero Mail Line*, Vol. 6, 1917, pp. 684-685). This line connects Turin with Rome.

ASIA

A New Interpretation of the Indian Monsoon. Mr. B. C. Wallis, in an article entitled "The Monsoon" in two recent numbers of *Indian Education* (Longmans, Green & Co., London), holds that "the hypothesis which states that the southwest monsoon is due to the high summer temperature and low summer pressure over Central Asia must at present be regarded with suspended judgment, if not with considerable suspicion." Mr. Wallis bases his objections on alleged facts and a general state of mind. The facts are of four kinds. (1) "Along the west coast of the Deccan the wind

blows on-shore from the sea from the end of March onwards, yet the rains fall with conspicuous suddenness in June." The implication appears to be that we have a monsoon blowing on the Western Ghats from the southwest during April and May with no rain. This flatly contradicts what we have been taught hitherto. Herbertson (*The Distribution of Rainfall over the Land*, London, 1901) gives 2 inches of rain at the southern end of the Western Ghats as early as March, 4 inches in April, and 12 inches in May. Although 16 inches fall along the whole coast in June, Wallis' statement that the rains "fall with conspicuous suddenness in June" is not accurate. (2) "Similarly in Burma and Assam the on-shore winds from the Bay [of Bengal] precede the coming of the rains by weeks." No dates are given, and we can only set Mr. Wallis' statement against that of the climatologists. We note that the hills of Assam have 2 inches of rain as early as February, from which time the rainfall increases to 16 inches in May, when Burma joins in suddenly with 12 inches, *just as if* the monsoon had begun in May, as we have been taught. (3) "In the case of the Madras coast, the rains precede the trade winds in the north, and the winds last long after the rains have ceased, i. e. during January and February." The rainfall of the north Madras coast is given by Herbertson as 2 inches in May, increasing from that time onward till it is nearly 8 inches by the end of September, while a little back from the coast more than 8 inches fall. Beginning with October the rains are heavier along the coast referred to than just inland, and the northeast trades are stated by Herbertson to prevail. It is not true that the northeast trades precede the rains. As the northern Madras coast trends northeast-southwest, it parallels the northeast "trades," and rains on that coast are hardly to be referred to them. But in southern Madras, where the coast runs north and south, November sees heavy rains with the northeast winds. The rains of northern Madras are referred by Mr. Wallis as well as other writers to cyclonic storms from the Bay of Bengal. So the period of these rains does not depend on the period of the northeast winds at all. (4) "During July and August a strong wind sets from the southwest from the African side of the Arabian Sea on-shore on the coast of Sind. The monsoon as an on-shore wind is fiercest there, yet Sind is arid." A glance at Herbertson's map shows us Sind with 2 to 4 inches in July and in August, too, while all the other months have less than 1 inch there. Evidently the two months of "fiercest monsoon" are the only wet months Sind knows! But Sind is low and level, and it is not on low and level lands, especially when heated by a zenithal sun, that monsoon winds are supposed to yield their rainfall.

Mr. Wallis' state of mind appears to be a conviction that the monsoons, like other features of the weather at the bottom of the "troposphere," are controlled by happenings in the "stratosphere," 8 or 9 miles above. He admits that we do not know much about the stratosphere yet, but India is walled off from the rest of Asia by the Himalayas to the full depth of the troposphere.

But a most welcome note is Mr. Wallis' contention that too much generalizing from insufficient data is indulged in in customary teaching about climate. Simplicity is highly prized by all teachers and rightly, but nature is not simple but highly complex. Teachers should observe local climatic facts, he urges, especially the varied facts of rain and wind in different parts of India, and these facts will not fit in with a broad general scheme without much modification to local circumstances. It is hard at present to learn what the facts of the actual winds are in various parts of India. Blandford's "Climates of India" gives only generalities. You cannot learn from it even for Calcutta what winds prevail month by month and how often they are interrupted by other winds than the prevalent winds, nor what winds prevail when the rains are falling. Indeed facts about winds everywhere are difficult to ascertain, especially in connection with this important matter of rainfall. Our own Weather Bureau publishes nothing on this important matter. Prevalent winds are given but not the winds blowing during rain, which is for landmen the main interest in the wind. At Salt Lake City the prevalent wind is published as southeast, but all the heavy rains quoted from recent local records fell while the wind was mainly in the northwest, i. e., across Great Salt Lake to the city and the Wasatch just beyond. Buffalo, Chicago, Detroit, and San Francisco all have their prevalent winds in the southwest, but it must not be assumed that their rains come with southwest winds.

We should get a clearer idea of the rainfall of India as well as of that of Florida, if the wind during rain were published, and it is to be hoped that Mr. Wallis' plea to the teachers of India will induce them to put on record what the official meteorologists have not usually published.

MARK JEFFERSON.

India's Coal Supply. The war has forced India to depend upon her own supply of coal and has drawn attention anew to her large deposits. For the last ten years her output has been gradually increasing as a consequence of the extension of railroads and

the development of industries. War conditions have accelerated this increase. The manufacture of munitions and the difficulty of securing coal from outside sources brought her production in 1915 up to more than 17,000,000 tons, a million tons more than in 1913 and more than double the amount she produced in 1905. She now not only supplies her own needs but exports to Ceylon and the Straits Settlements. India's coal deposits are scattered well over the east-central part of the country. In Assam, where the collieries at Margherita and on the Namchik River are working, there is a large field whose reserve is calculated at several billion tons. All these are Mesozoic and Tertiary beds. In Bengal and the recently created province of Bihar and Orissa are found the deposits that, at present, yield the greatest amount—over ninety per cent of the entire output. The best producing fields here are those of Raniganj and Jherria, the former in 1915 yielding 5,485,000 tons, the latter 9,141,000. Both of these fields contain large reserves, that of the former being estimated at 22,000,000,000, of which 518,000,000 are first-class coal. The Jherria field falls little behind these figures. The Giridih field, lying not far to the north, is not so well explored but has very large deposits.

In Central India and the Central Provinces few mines are actually being worked, but large quantities of good coal have been recognized, while in the Godavari basin, extending from near the coast along the Godavari River, important reserves are believed to be probable.

As the coal measures of Bengal and the province of Bihar and Orissa also contain clay ironstones and lie, generally, in territory that can be easily reached from the coast or are near important centers of industry, their value to India will probably increase very greatly as her industrial life develops.

Up to the present time the labor supply for the mines has been derived largely from the agricultural population. The farmers from the mountainous country of Chota Nagpur and the Central Provinces till their lands and reap their harvests still but migrate to the coal regions between times, somewhat as the Chilean laborers go north to the nitrate fields in winter and back to the farms of Central Chile in the summer season. This is a rather unsatisfactory supply for mining labor. It will probably change, and coal mining will become the regular occupation of a population at the coalfields.

The *Journal of the Royal Society of Arts* for June 22, 1917, quoting from the *Pioneer Mail*, summarizes the "Report on the Production of Coal in India" recently issued by the Department of Statistics. A description of the coalfields of India may be found, too, in "The Coal Resources of the World" prepared for the Twelfth International Geological Congress, Canada, 1913, while a more detailed account of the various fields is contained in a treatise on the "Coal Fields of India" by R. R. Simpson in Vol. 41, Part I, of the *Memoirs of the Geological Survey of India*, Calcutta, 1913.

Aden, the Emporium of Southwestern Arabia. The British district of Aden has become, in recent years, a distributing center for merchandise between Bombay and Suez, as well as from the Persian Gulf and Arabian and East African ports. At Aden the trader from Mombasa or Madagascar rubs elbows with Malabar Hindus, Bushire Persians, and desert Arabs. Although the war has interfered with the business of this trade center, its commercial exchanges with foreign parts are on the increase. Trade between Aden and America is growing and promises to become important. This lends interest to a recent report on the district by Consul Addison E. Southard published as *Supplement No. 49a to Commerce Reports* for May 7, 1917.

The local consumption of goods is insignificant. But as a center through which important markets can be reached, Aden is very advantageously situated. Its harbor is wide and commodious, being four by eight miles in area and providing anchorage for steamers drawing as much as 32 feet. The cargoes discharged at Aden are distributed over a large part of southern Arabia between the Red Sea and the Persian Gulf. They find their way to the Italian colony of Eritrea, to Abyssinia and the French colony of Jibuti, and to Somaliland. From all these centers a large quantity of merchandise is sent in return to Aden. Through Jibuti come cargoes of Abyssinian hides and coffee. The products of the Yemen and Hadramut rearlands are borne on camels, pack caravans reaching Aden daily. Thus a wide area of southwestern Asia and northeastern Africa is dominated commercially by Aden. In addition the district is a coaling station of prime importance and an advanced outpost of the Indian Empire.

HUMAN GEOGRAPHY

Graphic Representation of the Effect of Climate on Man. The admirable work of Dr. Griffith Taylor upon the climate and crops of Australia has already been reviewed

in the *Geographical Review* (Vol. 1, 1916, p. 396). He has now published a still more interesting paper on "The Control of Settlement by Humidity and Temperature" (*Commonwealth Bur. of Meteorol. Bull. No. 14, Melbourne, 1914*).

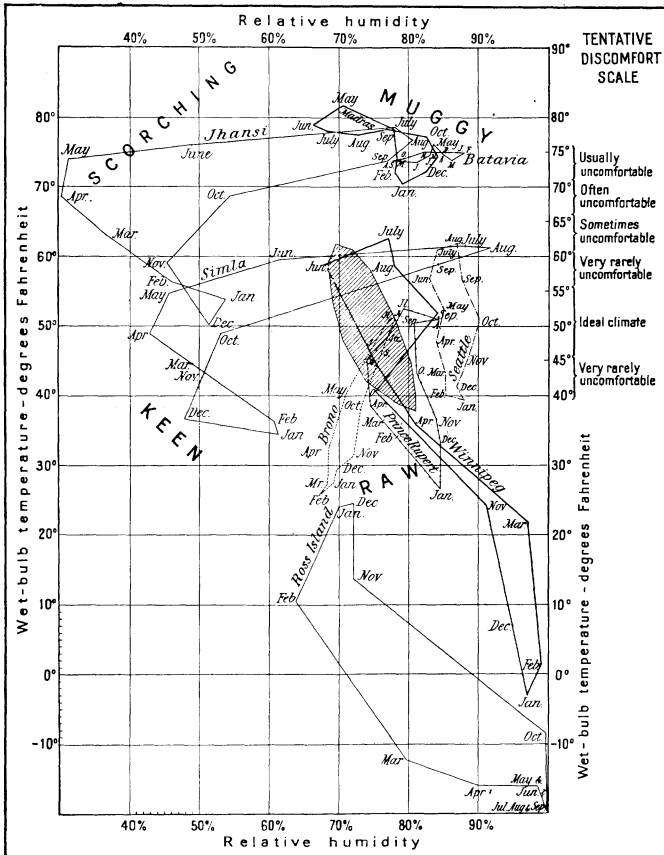


FIG. 1.—A "climograph" of nine different places, affording a criterion as to the effect of their climates on man. The places are: Batavia, Java; Madras, Jhansi, Simla, India; Seattle, Wash.; Brönö, Norway ($65\frac{1}{2}^{\circ}$ N.); Prince Rupert, B. C.; Winnipeg, Man.; Ross Island, Antarctic (78° S.). (Redrawn from Fig. 9 of Griffith Taylor's "The Control of Settlement by Humidity and Temperature.")

A "climograph" is a graph in which the twelve monthly mean values of wet-bulb temperatures and relative humidity at a given place are plotted as a twelve-sided polygon. The shaded polygon is a composite climograph and represents ideal conditions for the white race.

bulb temperature as the two chief climatic criteria and draws a series of figures one of which (Fig. 9, opp. p. 20) is here reproduced.

His method is unique and so valuable that it ought to be widely understood. The ordinates of the diagram represent relative humidity, and the abscissas the wet-bulb temperature. On the basis of these two criteria a point on the chart is located for a given place for each month. Then the months are connected in their proper order, thus giving a closed figure whose lines may or may not cross. Four extremes are possible, as is indicated by the words "scorching," "muggy," "raw," and "keen" in the corners of the diagram. In order to find the ideal conditions as nearly as possible, Dr. Taylor chooses twelve large cities in regions where the white man prospers. Five of these are in the southern hemisphere, namely, Sydney, Perth, Hobart, Capetown, and

the paper applies primarily to Australia it touches upon all parts of the British Empire and upon many other countries. Dr. Taylor's purpose is to discover whether there is ground for the hope that Australia may ever become a genuine white man's country, that is, a country densely settled by members of the white race. In pursuit of this object he first gives us some excellent maps showing the mean range of temperature in Australia between the hottest and coldest months and the mean humidity of the continent for each month. He then proceeds to develop what he has called the "climograph." Like many other recent students he is convinced that humidity is as important as temperature. If a climate is to be represented by only a single set of monthly numbers, the wet-bulb, or "sensible," temperature comes nearer than anything else to showing how man is affected. Accordingly he selects humidity and wet-

Johannesburg, and seven are in the northern hemisphere, namely, London, Aberdeen, Berlin, Toronto, New York, Chicago, and Seattle. From the average monthly figures for these twelve he prepares a "composite white climograph," which is shown by the shaded area in the diagram. He assumes that the conditions thus represented are close to the ideal. New Zealand, England, and the Puget Sound region come nearest to this ideal. This result agrees closely with the conclusions of the reviewer, based on a wholly different method, a fact which Taylor brings out forcibly.

While the general value of Taylor's method cannot be doubted, one special point leaves room for question. By using the wet-bulb temperature and the relative humidity he seems to have given double weight to humidity. The wet-bulb temperature is in itself an expression of the amount of moisture in the air. Its chief value consists in the fact that it enables one to describe the effect of a climate by means of a single set of figures or a single curve. If two sets of figures are used and diagrams are drawn in two dimensions the actual temperature and the humidity would seem to be the ones that should be chosen. The use of this method is illustrated by W. D. Pierce in his paper on the boll weevil (*A New Interpretation of the Relationships of Temperature and Humidity to Insect Development*, *Journ. Agric. Research*, Vol. 5, 1916, pp. 1183-1191). His diagram is here reproduced. By a long series of experiments Pierce determined the death-rate of the weevils under various conditions of humidity and temperature. He was thus able to locate a central or optimum area where the insects thrive vigorously. Around this area he was also able to draw concentric lines showing the degree to which the weevils are weakened, and the conditions under which they become dormant and finally die. He suggests that a similar diagram might well be drawn for man. As visual representations of the various effects of climate, however, Taylor's diagrams are much the best yet available.

ELLSWORTH HUNTINGTON.

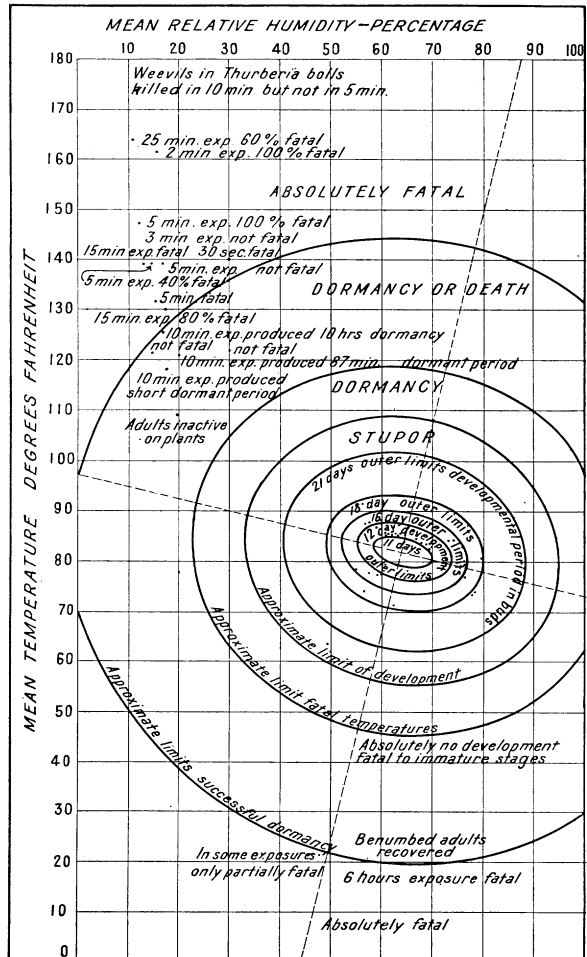


FIG. 2—Graph showing the relations of temperature and humidity to cotton boll-weevil activity. (Redrawn from Fig. 1 of the paper by W. D. Pierce mentioned in the text.)

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GEOGRAPHICAL NEWS

Free Geographical Material. The May, 1917, number of the *Journal of Geography* is devoted to the useful object of presenting a fairly complete list of geographical publications that may be obtained free or at small cost. There is an introductory discussion

followed by a general list arranged in alphabetical order by countries. This is followed by a list of references on industries and commercial products, a miscellaneous list, a compilation of educational exhibits, and a list of addresses of dealers in geographical supplies. The whole number is one which every teacher of geography should have at hand and is especially valuable for the isolated school where appropriations for supplies are exceedingly limited. The above list is taken from a more complete list of geographical material published by the Eastern Illinois Normal School, Charleston, Ill., and sent free of charge to those applying to the school for it.

PERSONAL

PROFESSOR W. M. DAVIS of Harvard University read a paper on April 14 before the American Philosophical Society of Philadelphia on "Uplifted and Dissected Atolls in Fiji."

DR. W. C. FARABEE of the University of Pennsylvania, whose recent explorations in South America have been the subject of a lecture before the Society and of several notes in this *Review*, read a paper before the American Philosophical Society of Philadelphia on April 14 entitled "The South American Indian in His Relation to Geographic Environment."

MAJOR-GENERAL GEORGE W. GOETHALS read a paper before the American Philosophical Society of Philadelphia on April 14 on "The Slides on the Panama Canal."

DR. J. PAUL GOODE of the department of geography of the University of Chicago has been promoted from an associate professorship to a professorship in the department.

MR. HARVEY D. GOULDER, General Consul for the Lake Carriers Association, addressed the American Association of Port Authorities at Cleveland, Ohio, on September 11, on "Water-borne Traffic on the Great Lakes."

DR. ELLSWORTH HUNTINGTON gave a lecture before the Geographic Society of Chicago on October 26 entitled "The Turks and the Euphrates."

MR. ROBERT B. MARSHALL of the U. S. Geological Survey, as a major in the Engineer Officers' Reserve Corps, is at present engaged in military mapping for the War Department.

DR. FRIDTJOF NANSEN, who has been in this country since July 26 as Minister Plenipotentiary of Norway on Special Mission, addressed the Food Conference held on September 14-15 in Philadelphia at the American Academy of Political and Social Science.

DR. H. F. REID of Johns Hopkins University read a paper on "The Distribution of Land and Water on the Earth" before the American Philosophical Society of Philadelphia on April 14.

PROFESSOR BERNARD H. SCHOCKEL of the department of geography and geology in the Indiana State Normal School has taken a leave of absence to complete his course of study in Chicago University. His work at Terre Haute will be carried on by Dr. Charles R. Dryer, whom he succeeded in 1913.

DR. W. S. TOWER of the department of geography of the University of Chicago has been promoted from an associate professorship to a professorship in the department.